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KATTEN MUCHIN ZAVIS ROSENMAN
575 MADISON AVENUE
NEW YORK, NY 10022-2585

EXAMINER	
FAULK, DEVONA E	
ART UNIT	**PAPER NUMBER**
2644	9

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/488,373	MORITA, TORU	
	Examiner	Art Unit	
	Devona E. Faulk	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 January 2000.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 20 January 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09488373.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-4,6-8,15 and 16** are rejected under 35 U.S.C. 102(b) as being anticipated by Wu (U. S. Patent 4,571,680).

Regarding **claim 1**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback

sound" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data.

3. Regarding **claim 2**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a period T of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data.

4. Regarding **claim 3**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a

CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein in said altering step the period of the CPU interrupt signal is dynamically altered in correspondence with a period T of said sound data, the period of said CPU interrupt signal is dynamically altered , and the period of said CPU interrupt is dynamically altered to T/n (where n=2,3,...) .

5. Regarding **claim 4**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per

cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein in said altering step the period of the CPU interrupt signal is dynamically altered in correspondence with a period T of said sound data, the period of said CPU interrupt signal is dynamically altered , and the period of said CPU interrupt is dynamically altered to T/2.

6. Regarding **claim 6**,Wu teaches of an electronic music pace-counting shoe comprising a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal", "said CPU controlling said timer unit in accordance with a period T of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU

interrupt signal to agree, and generating a clear playback sound" and " wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3...) with respect to period T of sound data".

7. Regarding **claim 7**,Wu teaches of an electronic music pace-counting shoe comprising a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal" , "said CPU controlling said timer unit in accordance with a period of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound" and " wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3...) with respect to period T of sound data".

Claim 8 claims the electronic device of claim 7 wherein the period of said CPU interrupt signal is dynamically altered to T/2. All elements of claim 8 are comprehended by claim 7, therefore claim 8 is rejected for reasons stated above in claim 7.

8. Regarding **claim 15**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7, line 27) which reads on "dynamically altering a period of a CPU interrupt signal, that has been generated by a timer using a down-counter, in accordance with a sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein said sound data has a period and wherein said CPU controls the down-counter based on the period of the sound data.

9. Regarding **claim 16**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and

data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal, that has been generated by a timer using a down-counter, in accordance with a period T of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect, which reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein said CPU controls the down-counter based on the period of the sound data.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (U.S. Patent 6,238,291) in view of Wu (U.S. Patent 4,571,680) .

Regarding **claim 5**, Fujimoto discloses a device that comprises a CPU (400) that comprises an image circuit and an acoustic circuit , which reads on "image and audio data under CPU control" (See Figure 3). The acoustic circuit is connected to a speaker.
Wu teaches of a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "controlling said timer unit that generates a CPU interrupt signal in accordance with said read audio data to dynamically alter said CPU interrupt signal", "emitting to the speaker said sound data obtained in accordance with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree, the burden on the CPU is reduced , and a playback sound is generated from the speaker" and "

wherein the period of the CPU interrupt signal is dynamically altered in correspondence with a period T of said sound data and the period t of said CPU interrupt signal is dynamically altered to T/n where n=2,3..... It would have been obvious to one of ordinary skill in the art at the time of invention to use Wu's microcomputer in Fujimoto's device for the benefit of having a less expensive method of producing synthesized sound.

12. **Claims 9-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotto (U.S Patent 6, 392,613) in view of Furuhashi (U.S. Patent 5,789,690) in view of Kudo et al. (U.S. Patent 6,560,692) in further view of Saito (U.S. Patent 5,576,685) .

Regarding **claim 9**, Gotto discloses a portable electronic device comprising a microcomputer and a speaker. Although he teaches of a portable electronic device comprising a CPU and speaker, he fails to disclose a method of interrupt processing as claimed. Furahashi discloses a Furuhashi discloses a method for generating playback sound in an electronic device through an interrupt information generating apparatus and speech information processing apparatus including a CPU (2) and a speaker (11) (See Figure 1) and the CPU (2), which reads on "CPU", controls the addressing means for outputting the specified address information indicating the leading address of the speech information and the interrupt data is supplied to the central processing unit at the playback timing of the desired sound source data. [This reads on "dynamically altering a CPU interrupt signal in accordance with a sound data that is read from a CPU memory"]; a D/A processor, which converts the sound source data into analog signals to generate speech signals, which are outputted to the speaker unit (column 8, line 44). The memory is the means for controlling the CPU. Although he teaches on the above elements Furahashi fails to teach of a timer connect to a clock. This concept was well known in the art at

the time of filing as taught by Kudo. Kudo discloses a microcomputer comprising an 8-bit timer (960) connected to a clock timer (970) (Figure 23) and an interrupt controller (800). Although he teaches of a clock connected to a timer, Kudo fails to disclose a timer unit generating an interrupt signal using said down-counter. This concept was well known in the art at the time of filing as taught by Saito. Saito discloses a timer (40) that comprises a presettable counter to down-count preset data. This data is used to output an interrupt signal (column 3, lines 21-26). Modifying Wu's microcomputer by incorporating Kudo's clock timer and Saito's timer (including the down-counter) reads on the claimed matter. It is obvious that there is a bus controller connecting the CPU to other units. Wu further teaches of memories that hold the frequency data. The memories are what control the timer. It would have been obvious to one of ordinary skill in the art to modify the microcomputer in Gotto's portable device in the manner stated above for the benefit of having a less expensive manner of producing synthesized sound.

Claims 10-12 are comprehended by claim 9. Therefore claims 10-12 are rejected for reasons stated above in 9.

13. **Claims 13 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotto (U.S. Patent 6,392,613) in view of Wu (U.S. Patent 4,571,680).

Regarding **claim 13**, Gotto discloses a portable electronic device comprising a microcomputer (41), which reads on "a CPU". Wu discloses a microcomputer (SCP), which reads on "CPU", comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that

provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. Replacing Gotto's microcomputer, with Wu's microcomputer would read on " a timer that generates a CPU interrupt signal", "said CPU specifying a sound data by the timing of said CPU interrupt signal", " a speaker that emits sound corresponding to said analog signal" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to a period of said sound data". It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotto's portable electronic device by using Wu's microcomputer and interrupt processing for the benefit of having a less expensive method of producing synthesized sound.

14. Regarding **claim 14,** Gotto discloses a portable electronic device comprising a microcomputer (41), which reads on "a CPU". Wu discloses a microcomputer (SCP), which reads on "CPU", comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become

1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. Replacing Gotto's microcomputer, with Wu's microcomputer would read on " a timer that generates a CPU interrupt signal", "said CPU specifying a sound data by the timing of said CPU interrupt signal", " a speaker that emits sound corresponding to said analog signal" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where T is a period of the sound data and n=2,3,...)". It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Gotto's portable electronic device by using Wu's microcomputer and interrupt processing for the benefit of having a less expensive method of producing synthesized sound.

15. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (U.S. Patent 4,571,680) in view of Saito (U.S. Patent 5,805, 883).

Regarding **claim 17**,Wu teaches of an electronic music pace-counting shoe comprising a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61). The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6,

lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal". Although Wu teaches of the above elements, he fails to disclose a timer unit that generates a CPU interrupt signal using a down-counter. However this concept was well known in the art at the time of filing as taught by Saito. Saito discloses a timer (40) that comprises a presettable counter to down-count preset data. This data is used to output an interrupt signal (column 3, lines 21-26). Replacing Wu's timer with Saito's timer reads on " a timer unit that generates a CPU interrupt using a down-counter" , "said CPU controlling said down-counter in accordance with a period T of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound" .

16. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Gotto (U.S. Patent 6,392,613) in view of Wu (U.S. Patent 4,571,680) in further view of Saito (U.S. Patent 5,805, 883).

Regarding **claim 18**, Gotto discloses a portable electronic device comprising a microcomputer (41), which reads on "a CPU". Although he teaches on a portable electronic device comprising a microcomputer, he fails to teach on the interrupt processing as claimed. However this concept was well known in the art the time of filing as taught by Wu.

Wu discloses a microcomputer (SCP), which reads on "CPU", comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that

generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. Although Wu teaches on the above elements, he fails to teach of a timer that generates a CPU interrupt signal using a down-counter. However, this concept was well known in the art at the time of filing as taught by Saito. . Saito discloses a timer (40) that comprises a presettable counter to down-count preset data. This data is used to output an interrupt signal (column 3, lines 21-26). Replacing Gotto's microcomputer, with Wu's microcomputer and Wu's timer with Saito's timer would read on " a timer that generates a CPU interrupt signal using a down-counter", "said CPU specifying a sound data by the timing of said CPU interrupt signal", " a speaker that emits sound corresponding to said analog signal" and "wherein the CPU controls said down-counter based on a period of said sound data". It would have been obvious to modify Gotto's microcomputer in the manner stated above for the benefit of having a less expensive manner of producing synthesized sound.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 703-305-4359. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

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